Method of Test for

ORGANIC MATERIAL IN SOIL

LDH DISIGNATION: TR 413-71

METHOD A

Scope

1. This method describes a procedure for the determination of percentage of organic material present in a soil. This test shall be conducted on all soils in which there is evidence of organic matter present during the sampling, preparation of sample, or the conducting of physical or mechanical analysis. Results obtained by this method shall be the referee for acceptance or rejection of a soil with organic content.

Apparatus

2. The apparatus shall consist of the following:

(a) Oven - A fume free gravity convection oven capable of maintaining a temperature of 110°C ± 5°C (230°F ± 9°F).

(b) Balance - The balance shall have a minimum capacity of 100 grams and be sensitive to 0.1 grams.

(c) Furnace - The furnace shall be a muffle furnace capable of maintaining a temperature of 445°C ± 5°C. The combustion chamber shall be not less than 4 inches in width.

(d) Evaporating Dish - The evaporating dish standard form to be of coors porcelain, approximately 100 mm in diameter and of sufficient capacity to hold 40 grams of sample.

(e) - Desiccator

Test Sample

3. The sample shall be prepared according to the Method of Dry Preparation of Disturbed Samples for Test, LDH Designation: TR 411. The material passing the No. 10 mesh sieve shall be used.

4. A representative portion of approximately 40 grams of the prepared sample shall be placed in a 100 mm standard evaporating dish and dried in an oven at 110°C ± 5°C (230°F ± 9°F) to constant weight. The evaporating dish and sample shall be cooled in a desiccator and the weight of the sample recorded.

The oven dried sample shall be uniformly spread in a thin layer over the bottom of the evaporating dish and then placed in a furnace at 445°C ± 5°C for a minimum of six hours. The evaporating dish and sample shall be cooled in a desiccator and the weight of the sample recorded.

Calculation

5. Calculate the organic content from the following formula:

$$\% \text{ Organic Content} = \frac{A - B}{A} \times 100$$

Where

A = Weight of oven dry soil prior to combustion in furnace.

B = Weight of soil after combustion.

Note:

It is permissible to reduce the period of combustion to four and one-half hours if a 162 mm evaporating dish is used with a 40 gram sample.

Normal testing time is 60 hours.

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METHOD B
FOR QUICK APPROXIMATION

Scope

1. This method describes a quick procedure for the conservative approximation of the percentage of organic material present in a soil. This test shall be conducted on all soils in which there is evidence of organic matter present during the sampling, preparation of sample, or the conducting of physical or mechanical analysis. An organic content determined by this method to be greater than or equal to the minimum which defines an A-8 soil shall be confirmed by Method A. Results obtained by this method shall not be used as a basis for rejection of a material. (See Method A).

Apparatus

1. The apparatus shall consist of the following:

(a) Oven - A fume free gravity convection oven capable of maintaining a temperature of 100°C ± 5°C (230°F ± 9°F).

(b) Balance - The balance shall have a minimum capacity of 100 grams and be sensitive to 0.01 grams.

(c) Furnace - The furnace shall be a muffle furnace capable of maintaining a temperature of 950°C ± 50°C. The combustion chamber shall be not less than 4 inches in width.

(d) Crucible - The crucible shall be of coors porcelain and of sufficient capacity to hold 10 grams of sample. (No. 1 is usually adequate).

(e) Desiccator

Test Sample

3. The sample shall be prepared according to the Method of Dry Preparation of Disturbed Samples for Test, LDH Designation TR 411. If there is sufficient material available it is preferable to use the material passing the No. 40 mesh sieve. The material passing the No. 10 mesh sieve may be used.

Procedure

4. A representative portion of approximately 10 grams of the prepared sample shall be placed in a tared crucible and dried in an oven at 110°C ± 5°C (230°F ± 9°F) to a constant weight. The crucible and sample shall be cooled in a desiccator and the weight of the sample recorded. The crucible and oven dried soil are placed in the muffle furnace at 950°C ± 50°C until the organic material has been completely destroyed (one hour is usually sufficient). This should be ignited to a constant weight. The crucible and sample shall be cooled in a desiccator and the weight of the sample recorded.

Calculation

5. Calculate the organic content from the following formula:

$$\% \text{ Organic Content} = \frac{A - B}{A} \times 100$$

Where

A = Weight of oven dry soil prior to combustion in furnace.

B = Weight of soil after combustion.

Note:

The above test for organic matter will be accurate, when no volatile inorganic matter is present in the sample. The test has been found to be reliable for testing soils used in highway construction in Louisiana except in cases where shell or other similar materials are present. When these materials are found to be present, it is necessary to conduct a chemical analysis of the soil.

Normal testing time is 36 hours.